



EUROPEAN PATENT APPLICATION

Application number: **86104314.9**

Int. Cl.⁵: **H01M 4/58**, H01M 10/40,
H01M 14/00, G02F 1/17,
C01C 3/12

Date of filing: **27.03.86**

Priority: **29.03.85 JP 63317/85**
13.09.85 JP 201665/85

Date of publication of application:
15.10.86 Bulletin 86/42

Designated Contracting States:
AT BE CH DE FR GB IT LI LU NL SE

Date of deferred publication of the search report:
03.07.91 Bulletin 91/27

Applicant: **SAGAMI CHEMICAL RESEARCH CENTER**
4-5, Marunouchi 1-chome
Chiyoda-ku Tokyo 100(JP)

Inventor: **Honda, Kenji**
1-9-2 Minamidai

Sagamihara-shi Kanagawa(JP)

Inventor: **Kuwano, Atsushi**

4-4-1 Nishionuma,

Sagamihara-shi Kanagawa(JP)

Inventor: **Kiyohide, Matsui**

4-6-5 Misono

Sagamihara-shi Kanagawa(JP)

Inventor: **Ochiai, Junko**

194 Lucas Road

Shelbyville Tennessee 37160(US)

Inventor: **Miyama, Hajime**

1769-1 Fukazawa-cho

Nagaoka-shi Niigata(JP)

Representative: **Lehn, Werner, Dipl.-Ing. et al**
Hoffmann, Eitle & Partner Patentanwälte
Arabellastrasse 4
W-8000 München 81(DE)

Solid electrochemically reactive materials and thin-film devices using the same.

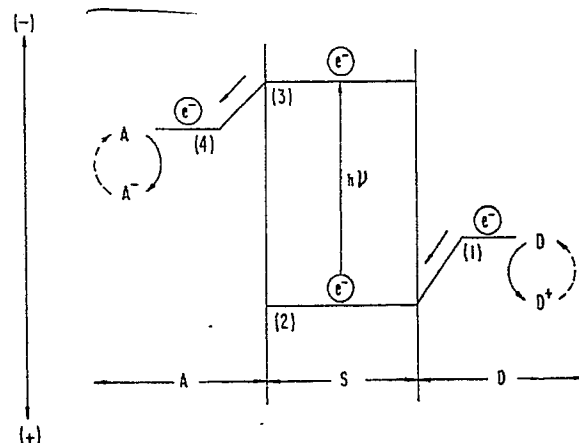
(57)

an electrochromic display device.

Solid electrochemically reactive materials and thin-film devices using the same.

A solid electrochemically reactive material is disclosed, which contains polymeric metal complex consisting of complex cation represented by a general formula of $M_A^X(L_A^a)_l$ and complex anion represented by a general formula of $M_B^Y(L_B^b)_m(L_C^c)_n$ wherein M_A^X and M_B^Y are transition metal ions of X valent and Y valent, respectively, L_A^a is a ligand having a valent positive charge, L_B^b and L_C^c are ligands having b valent and c valent negative charge, respectively, X, Y, a, l and n are positive integers including 0, b is a negative integer, c is a negative integer including 0 and m is a positive integer. The electrochemically reactive thin film is used as a dielectric membrane for a secondary battery and for

FIG.2





European Patent
Office

EUROPEAN SEARCH REPORT

Application Number

EP 86 10 4314

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl. 4)
X	EP-A-0 131 392 (SEIKO INSTRUMENTS & ELECTRONICS LTD) * Abstract; page 2, line 11 - page 8, line 16; claims *	1	H 01 M 4/58 H 01 M 10/40 H 01 M 14/00 G 02 F 1/17 C 01 C 3/12
Y	---	3	
Y	FR-A-1 351 592 (L.P. DURCRET) * Whole document *	3	
X	---		
X	PATENT ABSTRACTS OF JAPAN, vol. 8, no. 134 (C-230)[1571], 21st June 1984; & JP-A-59 45 922 (SEIKO DENSHI KOGYO K.K.) * Whole document *	1,2	
A	IDEM	1,2	
A	---		
A	EP-A-0 086 555 (K.K. DAINI SEIKOSHA) * Abstract; page 14, example 6; claims *	1,3	
X	---		
X	EP-A-0 068 634 (K.K. DAINI SEIKOSHA) * Abstract; claims 1-5 *	1	TECHNICAL FIELDS SEARCHED (Int. Cl. 4) H 01 M G 02 F C 01 C 3/12
X	---		
X	EP-A-0 083 861 (K.K. DAINI SEIKOSHA) * Whole document *	1	
A	---		
A	US-A-4 366 216 (J.E. MCGINNESS) * Whole document *	3	

The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 28-11-1990	Examiner DE VOS L.A.R.
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document			



CLAIMS INCURRING FEES

The present European patent application comprised at the time of filing more than ten claims.

- ☐ All claims fees have been paid within the prescribed time limit. The present European search report has been drawn up for all claims.
- ☐ Only part of the claims fees have been paid within the prescribed time limit. The present European search report has been drawn up for the first ten claims and for those claims for which claims fees have been paid, namely claims:
- ☐ No claims fees have been paid within the prescribed time limit. The present European search report has been drawn up for the first ten claims.

X LACK OF UNITY OF INVENTION

The Search Division considers that the present European patent application does not comply with the requirement of unity of invention and relates to several inventions or groups of inventions, namely:

See sheet -B-

- ☐ All further search fees have been paid within the fixed time limit. The present European search report has been drawn up for all claims.
- ☐ Only part of the further search fees have been paid within the fixed time limit. The present European search report has been drawn up for those parts of the European patent application which relate to the inventions in respect of which search fees have been paid, namely claims:
- ☒ None of the further search fees has been paid within the fixed time limit. The present European search report has been drawn up for those parts of the European patent application which relate to the invention first mentioned in the claims, namely claims: 1, 2



LACK OF UNITY OF INVENTION

The Search Division considers that the present European patent application does not comply with the requirement of unity of invention and relates to several inventions or groups of inventions, namely:

The electrochemical reactive materials as claimed in claims 1,2 not being new, there appears non unity a posteriori between the next 3 sets of independent claims:

1. Claims 1,2: Solid electrochemical reactive materials containing certain polynuclear metal complexes.
2. Claims 3,4: Battery containing these solid electrochemical reactive materials.
3. Claims 5,6: Electrochromic display device containing as a whole: an opaque backing material incorporated into the mentioned polynuclear metal complexes, the whole between supporting electrodes.
4. Claims 7,8: A semiconductor containing electrochemically reactive material composed of a semiconductor and an electron donor-electron acceptor at least one of the two consisting of the mentioned polynuclear metal complexes.